J. T. H. DEMPSTER.

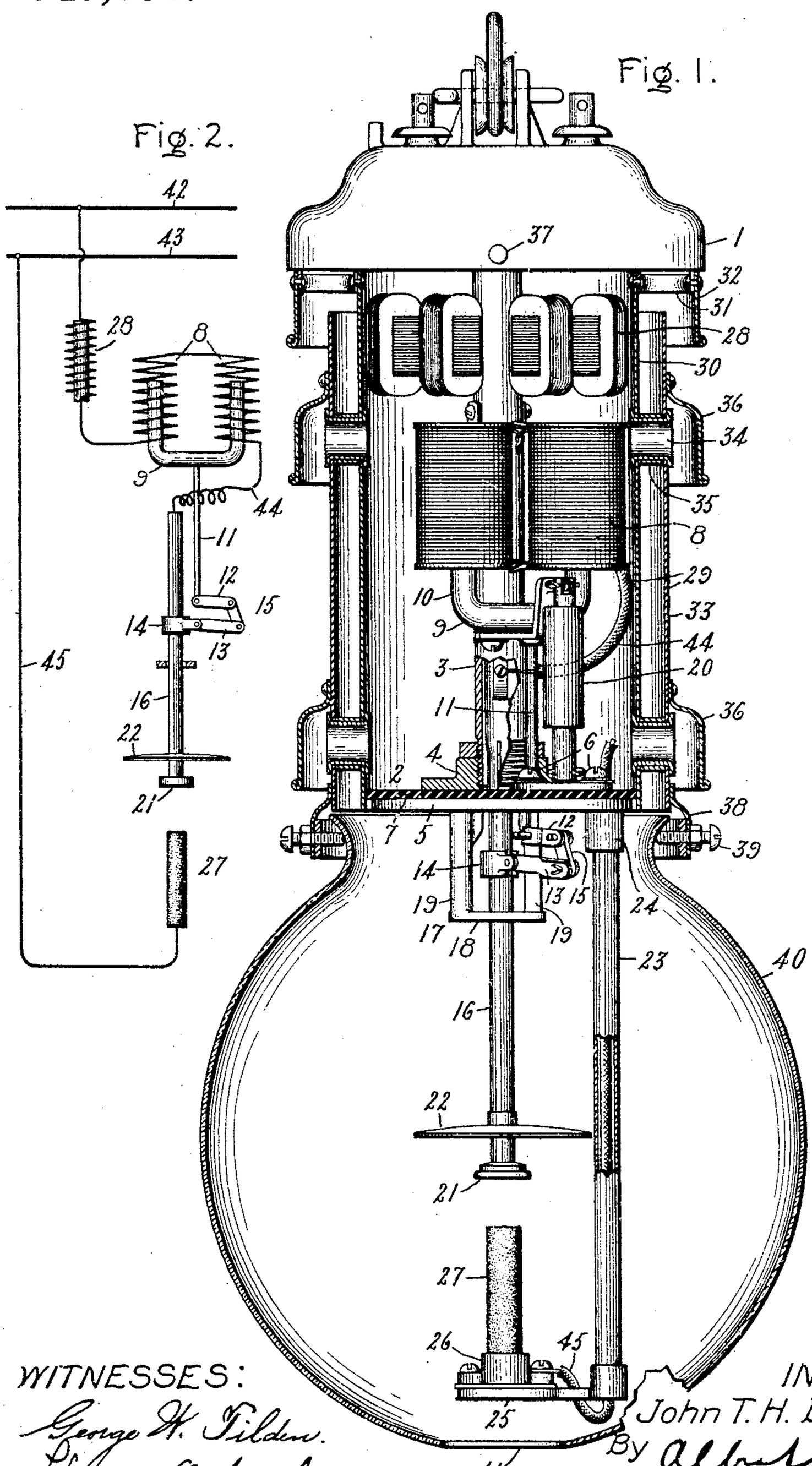
ARC LAMP.

APPLICATION FILED MAY 27, 1905.

949,353. Patented Feb. 15, 1910.

Fig. 1.

Fig. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN T. H. DEMPSTER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ARC-LAMP.

949,353. Specification of Letters Patent. Patented Feb. 15, 1910.

Application filed May 27, 1905. Serial No. 262,550.

To all whom it may concern:

Be it known that I, JOHN T. H. DEMPSTER, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a specification.

My present invention comprises certain features of construction and arrangement for the improvement of arc lamps.

My invention is particularly intended for use in an arc lamp of the type in which a negative electrode formed of or containing some material giving a luminous arc is employed in conjunction with a non-consuming positive electrode, though my invention in its broader aspect is not limited to any particular form of arc lamp.

In carrying out my invention I employ a movable positive electrode which moves toward and away from the negative electrode as the electrical condition of the arc changes. I attach to the movable electrode a device which serves to increase the heat radiating capacity of the electrode. This device may also be arranged to have a damping effect on the movements of the positive electrode as the electrical condition of the lamp varies by a sort of a dashpot action.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of my invention, however, reference may be had to the accompanying drawings and descriptive matter in which I have illustrated and described one of the many forms in which my invention may be embodied.

Of the drawings, Figure 1 is an elevation with parts broken away and in section of an arc lamp; Fig. 2 is a diagrammatic representation of the circuit arrangements of the lamp.

Referring to the drawings, 1 represents the lamp top or hood which is connected to the main platform 2 of the lamp by a tubular post 3. The platform 2 comprises a member 4 directly secured to the lower end of the post 3, an annular member 5 secured to the member 4 by screws 6, and a disk 7 of insulating material between the members 4 and 5. It will be understood that the screws 6 are arranged so that they do not electrically connect the members 4 and 5.

A pair of solenoid magnetizing coils 8 are secured to the post 3 with their axes parallel to each other and to the post. A U-shaped core or armature coöperates with these coils, the legs 10 of the core extending axially into the coils. An operating rod or bar 11 is secured to the yoke of the armature 9. The lower end of the bar 11 which extends through the platform 2 has adjustably secured to it an arm 12. The pawl member 13 of a clutch 14 is pivotally secured to the arm 12 by a link 15. The yoke member of the clutch 14 surrounds a bar or rod 16 which is formed of some metal such as copper which is a good conductor both of heat and electricity. The upper end of the bar 16 projects into the tubular post 3.

A bracket 17 comprising a lower horizontal portion 18 and two vertical portions or legs 19 is secured by bolts to the platform 2, but is insulated from the member 5. The portion 18 of the bracket 17 is provided with an aperture through which the member 16 passes. The portions 18 also serve as a stop against which the yoke of the clutch rests when the coils 8 are deënergized. In this case the outer end of the pawl 13 is depressed and the member 16 is free to move through the yoke of the clutch. When, however, the outer end of the pawl 13 is raised as by the attraction of the armature 9 by the coils 8, the member 16 is locked between the pawl 13 and the yoke member of the clutch 14. One member of a dashpot 20 is secured to the armature 9; the other member of the dashpot is secured to the platform 2.

The lower end of the member 16 is provided with a button or portion 21 which may be an integral enlargement of the rod 16, or may be a separate piece secured to the end of the rod. The button 21 forms the positive electrode of the lamp. A short distance above the button 21 is secured a disk 22 formed of some material such as sheet copper which is a good conductor of heat. The disk 22 may advantageously be in the neighborhood of 3 inches in diameter.

The upper end of a post 23 is secured in a socket 24 provided for the purpose on the under side of the member 5. The lower end of the post 23 supports a bracket 25 which

carries at its free end a socket 26 in which the negative electrode 27 of the lamp is secured. The negative electrode of the lamp which is in alinement with the bar 16 is formed of or contains some material such as titanium carbid, titanium oxid, magnetite, etc., giving an arc of the flaming or luminous variety. The core of a reactive coil 28 surrounds the post 3 to which it is secured above the coils 8.

A double walled casing 29 extends between the hood member 1 and the platform 2 and surrounds the mechanism located between the hood and platform. The casing comprises an inner cylindrical wall 30, the lower end of which closely embraces the disk 7. An annular member 31 is secured to the upper end of the wall 30 which it surrounds. To the outer edge of the annular member 31 is secured a cylindrical hood portion 32. The outer casing wall is in the form of a cylinder 33 which surrounds the casing 30 from which it is separated by a space annular in cross-section. In the construction shown the walls 30 and 33 are secured together by tubular rivets 34. As shown, tubular spaces or washers 35 surround the rivets 34 and hold the walls apart. The double walled casing is secured in place in any suitable manner as by means of screws 37 which pass through the hood 1 and engage the upper portion of the member 32. A collar or extension 38 secured to the lower end of the outer casing wall 33 is provided with supporting means comprising screws 39 having a globe 40. An opening 41 is formed at the lower end of the globe 40 through which air may enter. Hoods 36 secured to the outer casing wall 33 prevent the passage of dirt or moisture into the mechanism chamber through the tubular rivets 34 while allowing the passage of cooling air currents.

The particular lamp which I have shown in the drawings is intended for operation in a constant potential direct current circuit.

In the diagram shown in Fig. 2, 42 and 43 represent the conductors which supply current to the lamp. One terminal of the winding of the reactance coil 28 is connected to the conductor 42. The other terminal of the reactance coil 28 is connected to one terminal of the coils 8 which are in series with each other. The other terminal of the coils 8 is connected to the upper end of the bar 16 by a conductor 44. In the actual lamp it will be understood that the conductor 44 is a flexible conductor and may have one of its ends passing through a slot formed for the purpose in the post 3 and secured to the upper end of the bar 16. A conductor 45 connects the conductor 43 and the negative electrode of the lamp.

When the lamp is in the out-of-service condition the button 21 drops into engagement with the upper end of the electrode 27. As soon as the lamp is connected in circuit current will begin to flow through a circuit which includes the winding of the coil 28, windings of the coils 8, conductor 44, bar 16, button or portion 21, electrode 27, and conductor 45. The passage of this current through the windings of the coils 8 causes the coils to be operatively energized and attract the armature 9. The upward movement of the armature 9 causes the outer end of the pawl 13 to be raised, thus locking the bar 16 between the pawl 13 and the yoke of the clutch 14, after which the bar 16 moves up with the armature 9 drawing an arc between the portion 21 and the end of the electrode 27. The upward movement of the bar 16 and the length of the arc struck are limited by the decrease of current flow through the windings of the coils 8 resulting from the increase of the arc voltage. The bar 16 moves toward and away from the electrode 27 or floats in the usual manner as the current decreases and increases. The bar 16 will again drop into engagement with the electrode 27 when the yoke of the clutch 14 engages the cross-piece 18. This occurs whenever the current through the lamp is stopped as by rupture of the arc or by cutting the lamp out of circuit. It may also occur from a decrease in the arc current due to decrease in length of the lower electrode and consequent undue lengthening of the arc.

With the negative electrode formed of or containing materials of the character hereinbefore mentioned, and with the comparatively long arc employed, variations in the voltage of the arc are apt to be quite pronounced. For this reason I have employed the reactance coil 28 to prevent violent fluctuations in the arc current. The disk 22 which is carried by the rod 16 quite close to the arcing portion of the positive electrode serves to rapidly conduct away heat from the arcing portion of the electrode, and radiate it, thus diminishing the oxidation of the arcing portion of the electrode by the heat incidental to the arc. This disk also serves as an aid to the dashpot 20 and reactive coil 28 in damping the oscillations of the positive electrode.

The air entering the globe 40 through the opening 41 passes out of the lamp through the space between the casing walls 30 and 33. As shown the casing wall 33 terminates below the annular member 31. The hood 32 prevents dirt or moisture from entering the arc chamber through the space between the walls 29 and 32. The upward current of air through the lamp serves to steady the arc between the electrodes 27 and 21 and to carry the arc products out of the lamp.

It will be obvious to all those skilled in the art that changes may be made in the form of the invention disclosed without de-

parting from the spirit, and I do not wish the claims hereinafter made to be limited to the particular embodiment disclosed more than is made necessary by the state of the art.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In an arc lamp, a movable non-consuming electrode, and a sheet metal heat radiating disk connected thereto at a point not remote from the arcing portion of the electrode, said disk being arranged transversely to the direction of movement of the electrode so as to serve as a damping device to retard the movement of the electrode.

2. In an arc lamp, a fixed negative consuming electrode giving a flaming or luminous arc, a floating positive non-consuming electrode, and a heat radiating member carried by the latter close to the arc and arranged transversely to the direction of movement of the electrode so as to serve as a damping device.

3. In an arc lamp, a movable electrode, a heat radiating member connected thereto adjacent its arcing portion, said heat radiating member being expanded, proportioned and arranged to serve as a damping device to retard the movements of said electrode.

4. In an arc lamp, a movable electrode having a combined heat radiating and damping disk extending transversely therefrom.

5. In an arc lamp, a movable electrode having a combined heat radiating and damping disk mounted thereon.

6. In an arc lamp, a movable non-consuming electrode, and a sheet metal heat radiating disk connected thereto at a point not remote from the arcing portion of the electrode, said disk being arranged transversely to the path of movement of the electrode so as to serve as a damping device to retard the movement of the electrode.

7. In an arc lamp, a fixed negative consuming electrode giving a flaming or luminous arc, a floating positive non-consuming electrode, and a heat radiating member carried by the latter close to the arc and arranged transversely to the path of movement of the electrode so as to serve as a damping device.

In witness whereof, I have hereunto set my hand this 25th day of May, 1905.

JOHN T. H. DEMPSTER.

Witnesses:

BENJAMIN B. HULL,

HELEN ORFORD.